

Chapter - 3

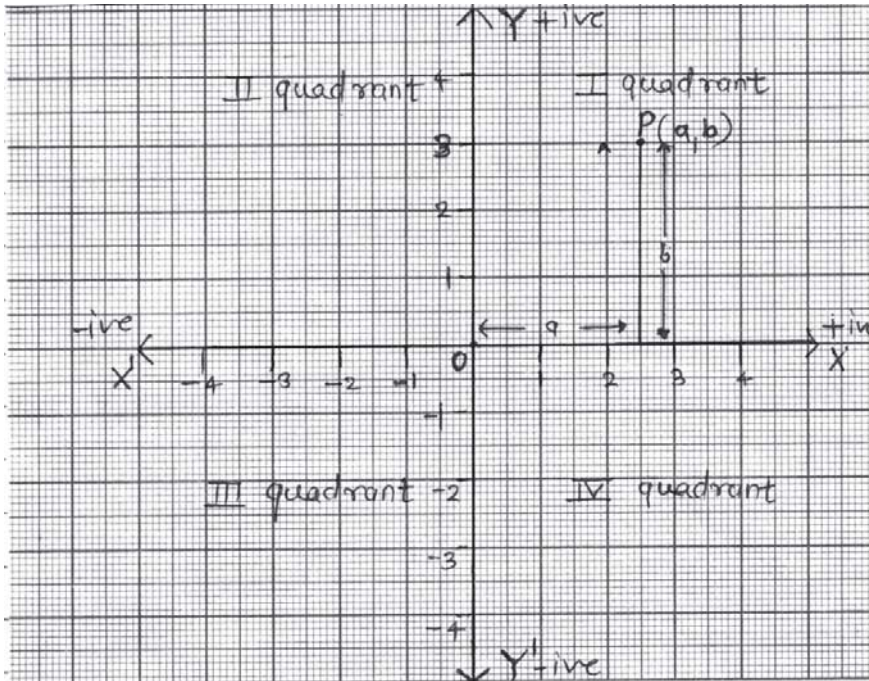
(Coordinate Geometry)

Key concepts

Coordinate Geometry : The branch of mathematics in which geometric problems are solved through algebra by using the coordinate system is known as coordinate geometry.

Coordinate System

Coordinate axes: The position of a point in a plane is determined with reference to two fixed mutually perpendicular lines, called the coordinate axes.



In this system, position of a point is described by ordered pair of two numbers.

Ordered pair : A pair of numbers a and b listed in a specific order with ' a ' at the first place and ' b ' at the second place is called an ordered pair (a,b)

Note that

$$(a, b) \neq (b, a)$$

Thus $(2,3)$ is one ordered pair and $(3,2)$ is another ordered pair.

In given figure O is called origin.

The horizontal line $X'OX$ is called the X-axis.

The vertical line YOY' is called the Y-axis.

$P(a,b)$ be any point in the plane. ' a ' the first number denotes the distance of point from Y-axis and ' b ' the second number denotes the distance of point from X-axis.

a -X - coordinate | abscissa of P .

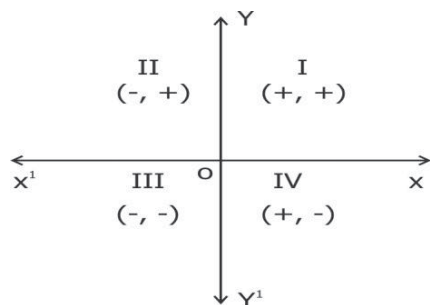
b -Y - coordinate | ordinate of P .

The coordinates of origin are $(0,0)$

Every point on the x-axis is at a distance 0 unit from the X-axis. So its ordinate is 0.

Every point on the y-axis is at a distance 0 unit from the Y-axis. So, its abscissa is 0.

Quadrants



Note :1. Any point lying on X – axis or Y -axis does not lie in any quadrant.

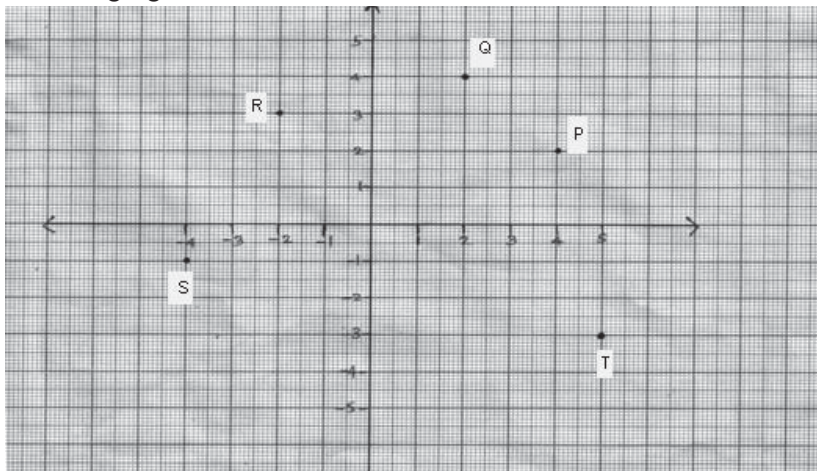
2. Every point lies on the x -axis whose y coordinate is 0 and every point lies on the y -axis whose x coordinate is 0.

Section - A

- Q.1 On which axes do the given points lie?
(i) (7, 0) (ii) (0, -3) (iii) (0, 6) (iv) (-5, 0)
- Q.2 In which quadrants do the given points lie?
(i) (4, -2) (ii) (-3, 7) (iii) (-1, -2) (iv) (3, 6)
- Q.3 Is P (3, 2) & Q(2, 3) represent the same point?
- Q.4 In which quadrant points P(3,0), Q(6,0) , R (-7.0), S (0,-6), lie?
- Q.5 If $a < 0$ and $b < 0$, then the point P(a,b) lies in
(a) quadrant IV (b) quadrant II (c) quadrant III (d) quadrant I
- Q.6 The points (other than the origin) for which the abscissa is equal to the ordinate lie in
(a) Quadrant I only (b) Quadrant I and II
(c) Quadrant I & III (d) Quadrant II only.
- Q.7 The perpendicular distance of the point P(4,3) from the y axis is
(a) 3 Units (b) 4 Units (c) 5 Units (d) 7 Units
- Q.8 The area of triangle OAB with O(0,0), A(4,0) & B(0,6) is
(a) 8 sq. unit (b) 12 sq. units (c) 16 sq. units (d) 24 sq. units

Section - B

- Q.9 Write down the coordinates of each of the points P,Q, R, S and T as shown in the following figure?



Q.10 Draw the lines $X'OX$ and YOY^1 as the axes on the plane of a paper and plot the given points.

(i) $A(5,3)$

(ii) $B(-3, 2)$

(iii) $C(-5, -4)$

(iv) $D(2,-6)$

Section - C

Q.11 Find the mirror images of the following point using x-axis & y-axis as mirror.

(i) $A(2,3)$

(ii) $B(2,-3)$

(iii) $C(-2,3)$

(iv) $D(-2,-3)$

Q.12 In figure C is mid-point of the segment AB. P and Q are mid-point of the segments AC and BC respectively.

Prove that $AP=BQ=1/4 AB$



Q.13 Draw a triangle with vertices $O(0,0)$ $A(3,0)$ $B(3,4)$. Classify the triangle and also find its area.

Q.14 Draw a quadrilateral with vertices $A(2,2)$ $B(2,-2)$ $C(-2,-2)$, $D(-2,2)$. Classify the quadrilateral and also find its area.

Q.15 Plot the points (x,y) given by the following table

x	2	4	-3	-2	3	0	-2
y	4	2	0	5	-3	1.25	-3

Answers

Q.1 (i) $(7,0)$ X-axis (ii) $(0, -3)$ Y-axis (iii) $(0,6)$ Y-axis (iv) $(-5,0)$ X-axis

Q.2 (i) $(4,-2)$ IV quadrant (ii) $(-3,7)$ II quadrant (iii) $(-1,-2)$ III quadrant
(iv) $(3,6)$ I quadrant.

Q.3 $P(3,2)$ and $Q(2,3)$ do not represent same point.

Q.4 These points do not lie in any quadrant. These points lie on the axes.

Q.5 (c) quadrant III Q.6 (c) quadrant I & III

Q.7 (b) 4 units Q.8 (b) 12 sq. units.

Q.11 $A^1(2,-3), B^1(2,3), C^1(-2,-3), D^1(-2,3)$

Q.13 right angle triangle area - 6 square units.

Q.14 quadrilateral is square area -16 square units.

Q.15 Every point on Y-axis satisfy this condition.